PROMOTION RECOMMENDATION
The University of Michigan-Dearborn
College of Arts, Sciences, and Letters

Aditya Viswanathan, assistant professor of mathematics, Department of Mathematics and Statistics, College of Arts, Sciences, and Letters, is recommended for promotion to associate professor of mathematics, with tenure, Department of Mathematics and Statistics, College of Arts, Sciences, and Letters.

Academic Degrees:

Ph.D.	2010	Electrical Engineering, Arizona State University, Tempe, AZ
M.S.	2008	Electrical Engineering, Arizona State University, Tempe, AZ
B.E.	2005	Electronics and Communication Engineering, R.V. College of Engineering, Visvesvaraya Technological University, Bangalore, India

Professional Record:

2017-present	Assistant Professor of Mathematics, Department of Mathematics and Statistics, University of Michigan-Dearborn
2013-2017	Visiting Assistant Professor, Department of Mathematics, Michigan State University, East Lansing, MI
2010-2013	Post-doctoral Scholar, Department of Applied and Computational Mathematics, California Institute of Technology, Pasadena, CA

Summary of Evaluation:

Teaching: Professor Viswanathan is rated excellent in teaching. A dedicated educator, Professor Viswanathan regularly teaches a wide range of courses in mathematics, from elementary courses such as Calculus I that satisfy the general education requirements to specialized courses like Numerical Analysis that are elected by graduate students in mathematics and engineering. His courses are intentionally designed to best support student learning and he incorporates active learning, the use of open educational resources, and second chance grading.

With strong numerical scores on his student evaluations, students comment that he is knowledgeable, well-organized, and engaging, as well as clear in his explanations and willing to help outside the classroom. In classroom observations, colleagues have noted the high level of interaction and impactful use of technology. Beyond his usual teaching load, he has supervised four master's projects and supervised several undergraduate research projects, with the students working on computational algorithms for image processing and phaseless image retrieval.

Research: Professor Viswanathan is rated excellent in research. A well-recognized applied mathematician, with broad research interests in the areas of computational harmonic analysis, scientific computing, and inverse problems in imaging, Professor Viswanathan's work focuses primarily on phase retrieval problems. This work is at the intersection of science, mathematics, and engineering and arises naturally in magnetic resonance imaging (MRI), x-ray crystallography, and transmission electron micrography.

With four articles and two refereed conference proceedings published since the start of his appointment, Professor Viswanathan has a consistent and respectable publication record. His innovative computational algorithms are both efficient and practical, accounting for errors associated with realistic data, as well as mathematically rigorous in their analyses of convergence rates and robustness. Several articles demonstrate optimal results, appearing in top tier journals, and he has given a number of presentations to both local and international audiences.

Recent and Significant Publications:

Perlmutter, M., Merhi, S., Viswanathan, A., and Iwen, M. (2021) "Inverting Spectrogram Measurements via Aliased Wigner Distribution Deconvolution and Angular Synchronization," *Information and Inference: A Journal of the IMA*, vol. 10, no. 4, pp. 1491-1531.

Iwen, M., Preskitt, B., Saab, R., and Viswanathan, A. (2020) "Phase Retrieval from Local Measurements: Improved Robustness via Eigenvector-Based Angular Synchronization," *Applied and Computational Harmonic Analysis*, vol. 48, no. 1, pp. 415-444.

Thavappiragasam, M., Viswanathan, A., and Christlieb, A. (2017), "MOL^T based fast high-order three dimensional A-stable scheme for wave propagation," *Journal of Coupled Systems and Multiscale Dynamics*, No. 2-4, pp. 151-163.

Iwen, M., Viswanathan, A., and Wang, Y. (2017) "Robust sparse phase retrieval made easy," *Applied and Computational Harmonic Analysis*, vol. 42, no. 1, pp. 135-142.

Service: Professor Viswanathan is rated excellent in service and his efforts have made a significant impact on campus, in the mathematical community, and throughout the region. He has proven to be effective in representing the department on several college level committees including the College of Arts, Sciences, and Letters Curriculum Committee and the Practice-Based Learning Advisory Committee. Professionally, he has reviewed articles for the *SIAM Journal on Scientific Computing*, *IEEE Transactions on Information Theory*, and the *Journal of Computational and Applied Mathematics*.

His engagement in a number of community outreach activities including the Maize and Blue Math Circle and GirlsGetMath@Dearborn demonstrate his commitment to diversity, equity, and inclusion. These outreach efforts aim to provide mathematical enrichment to underserved middle school and high school students in metro Detroit, as well as equitable access to resources in science, technology, engineering, and mathematics.

External Reviewers:

Reviewer A: "The body of work of Professor Viswanathan and his collaborators on phaseless reconstructions is in some sense optimal because it is computationally of O(N), and it provides theoretical guarantees. It is therefore, not surprising that the papers related to his work on the subject appear in prestigious journals such as [Applied and Computational Harmonic Analysis] and [the] SIAM Journal of Imaging Science."
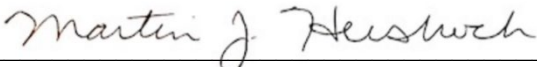
Reviewer B: "Aditya Viswanathan has demonstrated substantial contributions that are recognized internationally, and he shows great potential to continue his career in applied mathematics."

Reviewer C: "Dr. Viswanathan has an impressive research record and a promising research program in the field of phase retrieval."

Reviewer D: "Dr. Viswanathan has published a series of works and made unique contributions to the discipline. Together with his collaborators, he has developed a deterministic mask construction applicable to this problem and provided theoretical guarantee."

Reviewer E: "On a technical level, his results nicely combine tools from time-frequency analysis, numerical analysis, spectral graph theory, inverse problems, and linear algebra. Professor Viswanathan is one of the foremost experts on phase retrieval for the short-time Fourier transform; in my opinion, no other research group has made more comprehensive progress in this direction than him."

<u>Summary of Recommendation</u>: Professor Viswanathan is a well-recognized expert in applied mathematics with an impactful research program and an engaged educator who brings innovative techniques to his classroom. In his research, he has attained significant analytical and computational results in the areas of computational harmonic analysis and signal processing. He is committed to student success and engagement at all levels. With strong support of the College of Arts, Sciences, and Letters' Executive Committee, we are very pleased to recommend Aditya Viswanathan for promotion to associate professor of mathematics, with tenure, Department of Mathematics and Statistics, College of Arts, Sciences, and Letters.

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Martin J. Hershock, Dean   Domenico Grasso, Chancellor
College of Arts, Sciences, and Letters   University of Michigan-Dearborn

May 2023